THE

YOUNG MECHANIC.

MARCH, 1833.

CHEMISTRY.

[Continued from page 30.]

ATTRACTION.

There are several causes which operate to prevent or retard chemical action, such as cohesion, elasticity, quantity. First, *cohesion:* In some cases the energy of chemical affinity is so great as to overcome cohesion, while in others it is necessary that this power be first partially overcome. This is accomplished by mechanical division, by solution, or by heat. If two solid bodies, disposed to unite, be brought in contact with each other, the particles which touch will combine, and if the new compound which is formed be liquid at the temperature of the experiment, the combination will continue to take place, but if solid, the process will go no further.

Second, *elasticity.* This power sometimes opposes chemical union, as in the case of the gases, oxygen and hydrogen, which may be retained in mixture for any length of time without uniting; but flame or pressure will cause them to unite with great violence.

Third, the *quantity of matter.* It is found that the quantity of matter has considerable influence on chemical action. If, for example, we wish to saturate water with salts, we shall find that the first proportion added to the water is much more readily dissolved than the latter. Again, if we would decompose saltpetre by sulphuric acid, and use for this purpose sulphuric acid in quantity just sufficient to combine with the base of the saltpetre, we shall find, however carefully our experiment may be performed, that there will remain a portion of the saltpetre, which has escaped de-

composition. This is to be attributed, however, it is most probable, to mechanical obstruction.

In all chemical combinations, the proportions in which the particles unite, whether simple or compound, are governed by fixed laws.

This hypothesis, first suggested by Mr. Higgins, has been established by Mr. Dalton's experimental researches, and acknowledged by Davy, Wollaston, Berzelius, and other celebrated philosophers. Marble, from whatever part of the globe it may be obtained, either from its native bed, or prepared artificially, always contains 45 parts of carbonic acid, and 55 parts of lime, in 100 parts. Saltpetre, whether we prepare it by the direct union of its ingredients, or obtain it from its native locality, will consist of 54 parts of nitric acid, and 46 parts of potash. Water, from whatever source obtained, subjected to analysis, always affords 2 volumes of hydrogen to 1 volume of oxygen.

The combining power of bodies may be expressed by numbers. In water, for example, the weight of oxygen is to the hydrogen as 8 to 1 ; if therefore, we express the combining weight of hydrogen by 1, that of oxygen will be 8, carbon 6, sulphur 16, &c. Oxygen and hydrogen have both been assumed as unity by different writers—a circumstance to be regretted, and whatever advantages may arise from the adoption of one over the other, it is certain that either would have been better if universally adopted, than both. In the articles on chemistry which may follow, I shall consider hydrogen as unity.

If two substances unite in more than one proportion, the lowest compound will contain one or both principles in their smallest combining proportion; and in the higher the proportions will be such as are produced by multiplying the lower by some whole number.

This will be better understood by an example. Oxygen and hydrogen unite together in the proportions of hydrogen 1 and oxygen 8, to produce water—of hydrogen 1 and oxygen twice eight, or 16, to produce dentoxide of hydrogen. Nitrogen and oxygen unite together in five proportions, thus 1 nitrogen to 1 oxygen, 1 nitrogen to 2 oxygen, &c. &c.

Nitrogen 14, Oxygen 8, form Nitrous Oxide.
do. 14, do. 16, do. Nitric Oxide.
do. 14, do. 24, do. Hypo-nitrous Acid.
do. 14, do. 32, do. Nitrous Acid.
do. 14, do. 40, do. Nitric Acid.

The number representing any compound body, is found by adding the numbers representing its parts. For example, the number representing nitrogen is 14. It combines with oxygen in the proportion of 1 to 1, to form nitrous oxide. This, therefore, will be represented by 14 + 8 or 22. Nitric oxide by 30, &c.

The respective quantity of any bases, required to saturate a given quantity of any acid, or of any acid required to saturate a given

base, are always in the same ratio to each other, to whatever acid or base they may be applied.

The following will serve as illustration: Sulphate of potash and nitrate of baryta decompose each other, and the proportion of sulphuric acid in the former, will saturate the baryta of the latter; and the nitric acid of the latter will be saturated by the potassa of the former. This will be better understood by attaching the numbers representing combining proportions.

Before Decomposition.

Sulphuric Acid 40 + Potassa 48, forms Sulphate of Potassa.
Nitric Acid 54 + Baryta 78, forms Nitrate of Baryta.

After Decomposition.

Sulphuric Acid 40 + Baryta 78, forms Sulphate of Baryta.
Nitric Acid, 54 + Potassa 48, forms Nitrate of Potassa.

The combining weights of bodies, both simple and compound, may be registered in a table; this has been done by Dr. Wollaston, in his scale of chemical equivalents, the numbers of which, being attached to a sliding scale, afford the chemist great facility in his calculations. By mere inspection of this scale, we learn the equivalent number of any compound or simple body—the proportions of the elements of compounds, and the quantity of these which enter into any particular weight of a compound; the quantity of any substance required to decompose a compound, and the quantity of the products that will be formed.

ATOMIC THEORY.

The numbers representing the combining weight of bodies, have been applied to the atoms of which matter is inferred to be constituted; and the terms atomic weight and atomic constitution are often to be met with. Thus it is said bodies combine atom to atom, 1 atom to 2 atoms, &c. and the number expressing the lowest combining proportion is used to express the weight of the atoms; but as we cannot be certain that we know the smallest combining quantities of bodies, we cannot be certain that those numbers will correctly express the atomic weight of bodies; the hypothesis, however, is highly probable. The doctrine of definite and multiple proportions, it should be remembered, is not dependent upon this hypothesis for support, and cannot be affected either by the establishment of the truth or falsity of the atomic theory.*

It remains only to allude to combination by volume. It has been ascertained that gaseous bodies and bodies in the state of

* For a complete view of the atomic theory, see the writings of Higgins, Dalton, Buzelius—Henry's Chemistry, 10th edition, and Thompson's and Turner's Chemistry.

vapor, unite by volume in the proportions of 1 to 1, 1 to 2, 1 to 3, &c. These combinations coincide accurately with the law before mentioned, for it is evident that double, triple, &c. the volume of a gas, must be double, triple, &c. of its weight.

In the combination of bodies by weight, there is, as has been stated, a multiple relation existing between the different combining proportions of the same principle, but in the combination of aeriform bodies, there is a multiple relation also existing between the different principles which unite to form a compound. Thus nitrogen and oxigen combine together,

By Weight.

Nitrogen 14 + Oxygen 8.
Nitrogen 14 + Oxygen 16.
&c.

By Volume.

Nitrogen 100 + Oxygen 50.
Nitrogen 100 + Oxygen 100.
&c.

For the Young Mechanic.

ARCHITECTURE—No. 1.

Architecture is the art of building all sorts of houses, ships, and fortifications ; and is accordingly divided into three branches, civil, naval, and military. Civil Architecture is of very ancient origin—and it is the purpose of this and the following essays, to notice its early progress and history. *Modern* speculators can decide as correctly about the *origin* of building as those could who lived two thousand years ago. For we are in possession of as many facts, tending to throw light on this enquiry, as were possessed by the ancients ; and we can make as good use of them. From these facts we conclude that Architecture, like many other arts, had its origin in necessity. For man would be compelled by inclemency of weather and severity of climate, to seek for some kind of shelter. Caves, and dens, and hollow trees, and such rude dwellings as nature's hand had fashioned, were doubtless first resorted to. But these proving insufficient, man began to exercise his inventive faculties, to remove the inconveniences with which he saw and felt himself surrounded. It was then man became a builder. And, as security was the only object in view, he would use those means *only* which would attain this end. Internal convenience, and external beauty, were ideas with which he was totally unacquainted.

It would seem that a conical shape would suggest itself to the first builders, as the readiest mode of constructing their primeval

huts, and therefore boughs of trees, placed in the ground and brought to a point at the top, and then interwoven with reeds and covered with clay, formed, doubtless, the first artificial dwellings of the human race.

But there was one material inconvenience about these habitations. The sloping sides rendered it difficult for the occupants to stand upright ; and to remedy this evil, the cone was exchanged for the square. Upright posts were placed in the ground, to form the sides of the building ; and others were laid across their tops to support the covering or roof. Experience had, doubtless, by this time, taught the builders, that water would run down hill better than in any other direction ; and they would naturally make use of their knowledge in constructing the roofs of their square dwellings. And therefore rafters, and tie-beams, and pediments, became indispensable characteristics in this first improvement in the art of building.

Such, we may reasonably suppose, was the rude origin of that art, which, in subsequent times was brought to most sublime perfection ; and whose astonishing relics still mark the spots where lived the great and glorious nations of by-gone times.

D. B. H.

GEOMETRY AND ARITHMETIC.

[Continued from page 26.]

POWERS AND PROPORTIONS.

By the power of a quantity, is understood its product by itself a certain number of times. Any number is the root or first power of itself. Thus, the first power of 3 is 3 ; its second power or square is 3×3 or 9 ; its third power or cube is $3 \times 3 \times 3$ or 27, and so on. Hence it is evident, that to obtain any power whatever of a given quantity, it must be multiplied by itself, as many times less 1, as are equal to the number which denotes that power, as may be seen in the following

TABLE OF POWERS.

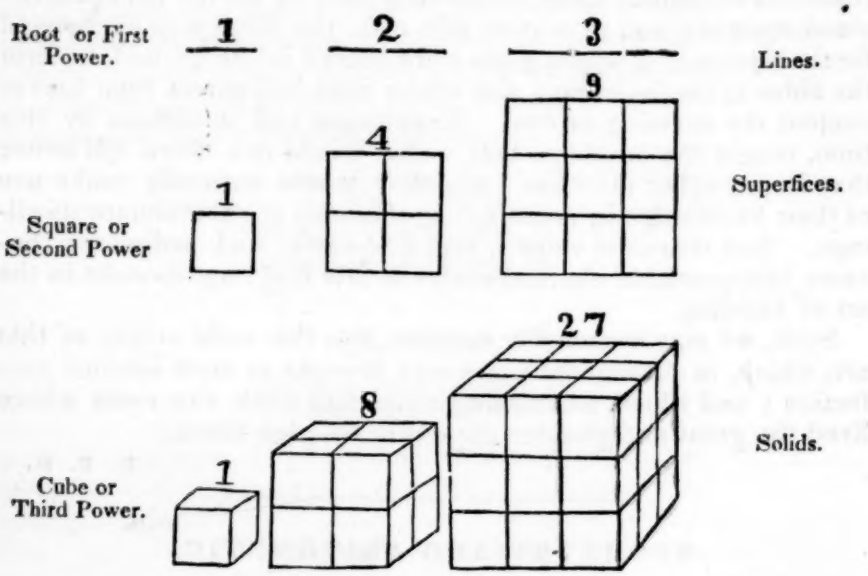
First Powers,	1.	2.	3.	4.	5.	6.	7.	8.	9.	Roots.
Second Powers,	1.	4.	9.	16.	25.	36.	49.	64.	81.	Squares.
Third Powers,	1.	8.	27.	64.	125.	216.	343.	512.	729.	Cubes.

It is necessary that we should be able not only to find the required power, when the root is given, but to extract the root when the power is given. In the table above, the third power of 5 is 125 ; the second power of 8 is 64 ; the cube root of 729 is 9 ; and the square root of 49 is 7.

It is not my intention to show how to extract the roots of numbers, as rules for this purpose may be found in most books on arithmetic. My object is to explain the subject generally, and to show

some of its uses, hoping that some of our young friends may be induced to turn their attention to this very useful subject.

The first power is applied to lines; the second power to superfices; and the third power to solids; which may be understood by the following diagrams.



The numbers placed over these diagrams, agree with the first three numbers in the table of powers.

DEFINITIONS.

A line is length without breadth.

A superfice has length and breadth, without thickness.

A solid has length, breadth, and thickness.

If we wish to find the length of a given line, we use a line of some known length as a standard, and this may be an inch, a foot, a yard, &c. The process is only to ascertain how many such lines are contained in the given line.

To find the area or quantity of surface of any superficial figure, we use a surface of some known dimensions for this purpose; and in order to make the process as simple as possible, the square is generally used; the side of this square may be an inch, a foot, a yard, &c. We then proceed to find how many such squares are contained in the given figure.

To find the contents of a solid body, we use a solid of some known dimensions; this is generally a cube, whose side is an inch, a foot, a yard, &c. We then find how many such cubes are contained in the solid body.

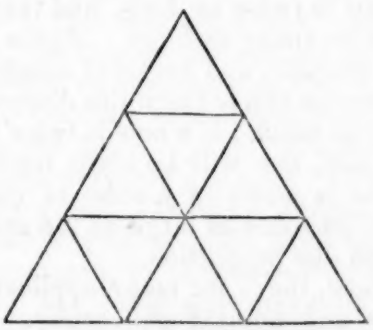
PROPORTIONS.

If lines increase by a common difference, like those in the diagram, they are said to be in arithmetical proportion. Calculations are made on lines by addition or subtraction.

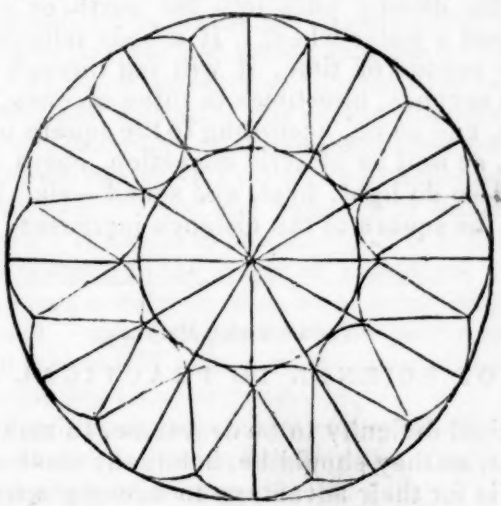
Superfices of the same kind, are to each other as the squares of their similar sides. This may be seen by the diagrams of the square, triangle, and circle. It is also true of all other figures.

Solids of the same kind are to each other as the cubes of their sides. Calculations are made on both surfaces and solids, by multiplication and division, and are said to be in geometrical proportion.

By examining the diagram marked Lines, we find their lengths as 1, 2, 3. The squares whose sides correspond to these lines, are as 1, 4, 9 ; and the cubes, whose sides are also similar to the above lines, are as 1, 8, 27. We find, in the squares, if the side is doubled, the area is fourfold, and if trebled, the area is increased ninefold, &c. In the cube, if the side is doubled, the solidity will be 8 times as great ; and if trebled, 27 times as great, &c.



By examining the diagram of the triangle, we find that one triangle has sides of a certain length ; that four such triangles have sides of double the length ; and 9 triangles are inclosed by sides of three times the length of the sides of 1 triangle. If we examine



the diagram of the circle, we find 48 triangular figures, called sectors ; 12 of them are in the small circle, and 36 between that and the large circle ; it may be seen that there is stock enough, if all the small pieces could be brought in, to make 4 circles, each having a diameter equal to half that of the large circle.

APPLICATIONS.

By the use of the powers of numbers, we are able, from the given lines of surfaces or solids, to find their superficial or solid contents; and by extracting the roots of these powers, we can find the lines of surfaces, or solids, by having their superficial or solid contents given. Thus, if the dimensions of a vessel be given, we determine what it will hold by the first method; or if it be required to make a vessel of a particular shape, to hold a certain quantity, the dimensions are found by the last method.

By knowing the relative proportions of various surfaces and solids, we are able to judge more correctly, and often without the aid of written calculations. If, for example, a town or state is twice as long, and twice as broad as another, it will be four times as large; or if a pond or lake is twice as long, and three times as broad as another, it will be six times as large. Again, if a house is three times the length, breadth, and height of another, it will be 27 times as large; if a cannon ball is twice the diameter of another, it will weigh eight times as much; if a cow is twice the length, and twice the height of her calf, she will be eight times as large; and if a model of a machine is made on a scale of one inch to a foot, the machine will be 1728 times as large as the model; of course, every part must be in due proportion.

Besides the above, there are many applications of these principles to geometry and natural philosophy. Sir Isaac Newton's grand discovery was, that the gravitation of bodies towards each other, is inversely as the squares of their distances, or that it decreases as the squares of their distances increase. The laws of falling bodies operate on this principle, whether it is a block of metal, used for driving piles into the earth, or a stream of water rushing against a water wheel. If a body falls through a certain space, in one second of time, it will fall through four times that space in two seconds, nine times in three seconds, sixteen times in four seconds, and so on, according to the square of the times.

Magnetic, as well as electric attraction, obeys the same law as gravity; and so do light, heat, and sound—viz. their intensities decrease, as the square of the distance increases. PHILO.

For the Young Mechanic.

UTILITY OF SCIENCE TO PRACTICAL MECHANICS.

The principal difficulty to be overcome, to make the great body of mechanics, as they should be, habitually studious, is to convince them that it is for their advantage to become *scientific*, as well as practical.

It is the prevailing sentiment, among this large class of the community, that a knowledge of principles is of no use to them; and therefore they take no deep interest in those writings and lectures

which are strictly scientific. The story of that mechanic who said he could get no more than his ten and sixpence a day, even if he did possess a knowledge of science, cannot be too often mentioned. This individual undertook to make a particular machine, and spent considerable time and money in completing it. When it was finished, he found to his utter surprise, that it would not work; and the reason was, an important principle in the science of mechanics, had not been at all regarded. *This* mechanic was now forced to acknowledge that he should have saved a little more than ten and sixpence a day, had he possessed a little more scientific knowledge.

I happened to have in my hand a few days since, the January number of the Young Mechanic. I opened to the engraving designed to illustrate the reflection of light. A friend of mine being present, I showed it to him, and remarked, that here was a fact worth remembering, viz. that a reflected ray of light always made an angle precisely equal to the angle of the incidental one. Instead of assenting to the truth of the observation that this fact *was* worth remembering, my friend replied, 'Of what use is it to you and I to be acquainted with this principle?' I thought it my duty to undertake to show him. Now he happened to be a tinman, and I a mason. And of what possible advantage, (repeated he,) is it to a tinman or a mason, to understand the laws and properties of light? I replied, that it was advantageous to any operative, when applying any principle, to understand what that principle was, so that he might know when it was properly or improperly applied. For it is certainly important for us to know whether we are making a proper or an improper use of a principle. To show that a knowledge of the law of light, stated above, was in some degree useful to the tinman, I alluded to the construction of the patent baker. If the inventor had not known that the angle of reflection was equal to the angle of incidence, he would not have been likely to make the top and bottom of this article diverging towards the fire at the proper inclination. This one instance was sufficient to show that the knowledge of this principle of reflection was of service even to the tinman. And one instance is sufficient to show, that this knowledge is useful to the mason. It is because the angle of reflection is equal to the angle of incidence, that the jambs of modern fire places are flared, instead of being built at right angles with the back. And this flare of the jambs must have that exact inclination which will reflect all the rays of heat which fall upon them from the fire into the room.

Thus I convinced my friend, that it *was* practically advantageous both to him and to me, to remember that the angle of reflection was equal to the angle of incidence.

But even on the supposition that mechanics will not have occasion to apply all or any philosophical principles, yet it is beneficial to have a knowledge of them. It will enable us to judge of the works of others; to detect their faults, to perceive their beauties,

and to know the degree of their utility. With our minds well stored with such knowledge, we shall always find matter for profitable reflection and useful conversation. To be conscious of possessing knowledge, gives to the mind a most pleasureable satisfaction—a real, solid happiness. To this, the operative mechanics are as much entitled as any class of society ; and this we can have, if we will but use the means with which we are amply supplied.

D. B. H.

For the Young Mechanic.

EVIDENCES OF THE ROTARY MOTION OF THE EARTH.

Messrs. Editors,—The reply of your correspondent, G. W. M. to my communication, has been to me the cause of considerable thought and reflection on this subject, which has resulted in the belief of the assertion made by Professor Farrar, and the *non*-belief in the position assumed by G. W. M.

I may probably anticipate the surprise of my friend by such a beginning, but really, when I inform him, that his position is *favored* by an unintentional mistake upon my part, and, that it is positively true that the ball would strike *east*, instead of west, he will certainly add *incredulity* to surprise. But let conviction follow proof. The reasoning which has led to the above result, I have become acquainted with since my first communication was written, and, I presume with some confidence, that it is the understanding which the lecturer intended to convey.

It is a well known fact, that the rim of a carriage wheel moves much faster than the hub, and that the difference of velocity is according to the distance that the rim is placed from the centre of the wheel. This being admitted, we must allow, that the earth, revolving on its axis, must necessarily obey the same laws. Therefore, if the surface of the earth, at the equator, or four thousand miles from the centre, moves with a velocity of one thousand miles an hour, and the height of a steeple placed there, one hundred and fifty feet, the top of the steeple must move as much faster than the bottom as the distance is greater from the centre of the earth ; and a ball at the top having acquired the same progressive motion, when set free, goes forward, while falling, with the same velocity as the top, which is greater than at the bottom, and in theory is resisted less by gravity, than accelerated by the difference of the projectile force given at the top of the steeple, when compared to the bottom.

Therefore the ball would strike east of a point perpendicularly under it.

J. M. W.

For the Young Mechanic.

NEW DISCOVERY.

A discovery has lately been made, which promises to be of great benefit to all classes of the community, especially to our mechanics, and particularly the younger portion of them. This contrivance, when put into extensive operation, possesses so much power, that the effects produced by the steam engine, dwindle into insignificance, when compared with the effects of this new machine. It is believed that suitable materials for the construction of these machines, exist in every section of this country; indeed, some persons are of opinion, that there are but few towns in which materials are not to be found more or less suitable for the work. The best specimens are found on the surface of the earth; in some places, however, great quantities are found far below its surface. Although they vary in size, form, and color, there is something characteristic about them, by which they may be easily known, when once pointed out. The grand obstacles in the way of constructing these machines, and putting them into operation, are the want of suitable tools and skilful workmen.

I have had an opportunity to witness the operation of several of these machines within a few months. One or two of them pleased me so much, that I was induced to attempt a description of them. The materials require considerable judgment in their selection, and they must be seasoned for years before they are fit for any part of the work. The main-spring or first mover, and some other parts, should be made of well tempered materials, for the several wheels, levers, &c. to be acted upon, are of such a nature, that they are subject to some irregularities in their movements. These difficulties, however, may be overcome by skilful management.

Like most kinds of machinery, the better the several parts are fitted and polished, the more likely they will be to perform well. But it appears necessary that the various rubbing parts should be kept in motion for some time before the machine can be said to be finished; for, after the workman has done his best, there will still remain many sharp edges, as well as protuberances and eccentricities, which had entirely escaped his notice, or their removal was beyond his art.

Those persons who have devoted most time and money towards perfecting this invention, do not wish to monopolize the business by a patent; but would be glad to furnish all the assistance in their power towards establishing them in various parts of the country. These machines are not of that class called labor-saving, but their introduction will have a direct tendency to lessen the expenses of many persons. The laboring class will reap their full proportion of the benefits, if they act wisely, and adopt them without delay; and there is no danger of too many being introduced,

as the article manufactured is not likely to become a drug in the market.

I was present the other evening at the anniversary celebration of the 'Boston Mechanic Apprentices Library Association,' at Chauncey Hall; where an Address and a Poem were delivered by two of the members. These exercises appeared to give general satisfaction to the numerous audience that attended on this occasion. This is certainly one of the most useful institutions in the city. The members have the sole charge of an extensive library, and they rent a room where they hold two meetings in a week, one for lecturing and debating, and the other for the distribution of books. At both meetings, when no exercises are going on, they amuse themselves by reading the papers, which they are supplied with by the kindness of our publishers. Their exercises create a demand for scientific books, that might otherwise be slumbering on their shelves. In addition to their library, they have commenced a cabinet of minerals, and specimens of the various kinds of wood, &c. Does not this afford a fine chance for the young mechanics of Boston to improve themselves?

Apprentices' libraries exist in various cities and large towns in the Union, and many more might be formed with advantage, especially if the young folks have exercises to perform. They will then have some inducements for study. When they are free, they will make good members of societies for mutual improvement. It seems necessary that there should be a link of this kind in the chain of that education, which begins as soon as we have any discernment, and continues as long as our faculties are preserved. We are learning all the time, and our minds will be filled with knowledge of some kind or other. Then it must be a great discovery, to find a plan, by which even the laboring class, may, by associating together, improve themselves in useful practical knowledge.

PHILO.

For the Young Mechanic.

POWER OF A STEAM ENGINE.

Messrs. Editors,—So long ago as last July, I saw an inquiry made through the Young Mechanic, as to the number of horse-power a steam engine is equal to, with steam seventy-five pounds to the square inch, area of piston twenty-eight inches, length of stroke two feet, double strokes, per minute, seventy-five. As I have seen no answer to it, I suppose every one who can give one is waiting for some one else to do it. But, for fear we should have none at all, I will show you how I should figure it out, and if I am wrong, I hope some one, better versed in these matters, will set me right.

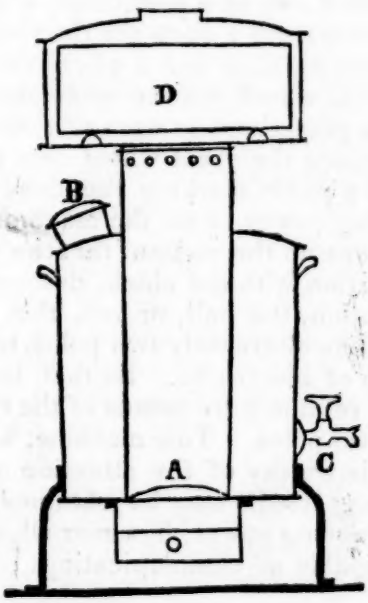
$75 \times 28 = 2100 \times 4 = 8400 \times 75 = 630{,}000 \div 33{,}000 = 19\ 1\text{-}11.$

In the preceding line, I multiplied the pressure to the inch by the area of piston—that by the length of stroke both ways—and that by the number of strokes per minute. The result of this appears to be, that if only one pound were acted on, that power would be able to force it (friction excepted) a distance of 630,000 feet per minute ; or if a weight of 630,000 pounds were acted on, it would raise it one foot in the same time. A horse power I suppose to be what is equal to that exerted by a weight of 33,000 pounds, descending at the rate of one foot per minute. This makes the engine of the power of nineteen and one eleventh horses, which is more than double what the engine is estimated at by the builder. In this, however, I have made no allowance for friction. How much should be allowed for this ? I hope some of your correspondents will answer this question, and throw some light on the whole subject, as I suppose there are others besides myself who do not see it clearly. J. E. H.

For the Young Mechanic.

ANDERSON'S PORTABLE KITCHEN.

This simple contrivance seems to be a convenient, economical, and safe article of cooking apparatus. The principles of the invention consist in boiling and baking with the same fire.



DESCRIPTION.

A is is a sheet iron pipe, circumscribed by a tin cylinder. At the bottom of this pipe is a grating, opening downward, on which

the fuel, which is charcoal or anthracite, is laid. Beneath the grating is an ashes pan, with a small opening in the top of its front for the admission of air. B is a tunnel through which the water is poured into the cylinder. C is the outlet for the same. D is a sheet iron bake-pan, standing within a sheet iron cylindrical baker. The fuel is to be put in at the top of the funnel, when the baker is off. Instead of the baker represented in the cut, a coffee pot, or any vessel of the kind, can be placed on the top of the funnel. This machine is an improvement on the modern cooking furnace. It can be placed with safety on the hearth, in a shed, or in the open air. When occasion requires, a pipe can be attached to the top of the baker or funnel, to carry the smoke and gas into the nearest flue.

The inventor, Mr. Thomas K. Anderson, of this city, is about getting a patent for the above. EDS.

From the Repertory of Patent Inventions.

CURIOUS CLOCK.

THE Journal of Geneva gives the following description of a clock exhibited in that city, and made by M. Bianchi, of Verona. This machine, which is especially remarkable on account of its extreme simplicity, is composed only of a pendulum, a large wheel, two escapements, and a quadrature ; such are the visible parts. We must however suppose that a pinion and a wheel make the communication between the great wheel and the quadrature, though we cannot see them. The pendulum, at each vibration, causes one of the escapements to advance the great wheel one tooth, which, after this movement, has a pause marking the dead second. As there is no metallic moving power to set the machine going, we find, on examining what keeps up the motion, that the pendulum, which is almost out of proportion with the clock, descends into a case, and there, at each vibration, the ball, or bob, that is furnished with a conductor, approaches alternately two poles, to which voltaic piles supply their portion of electricity. So that the pendulum, when once put in motion, retains it by means of the electricity alternately drawn from the two poles. This machine, which is equally simple and ingenious, is worthy of the attention of the artist. Perhaps other interesting results may be obtained, by employing the electric fluid as a moving power, however slight the force such an agent may seem capable of communicating.

Miscellany.

Inventions Encouraged.—Congress continues its wise and liberal plan of rewarding useful inventions. An act of July 3, authorizes letters patent to be issued to Thomas Knowles, of Manchester, Eng. for a machine for cotton ; to James Lang, of Greenock, for a machine to spin rope-yarn and duck twines ; and to William Steele, of Liverpool, for his atmospheric and re-acting steam engines : provided, that they introduce those alleged improvements into use in the United States within two years from date, and deposit models in the Patent Office in the usual time.

Thus mind exerted in any country, becomes useful to all countries, and arts and sciences spread among men.

Since that act, a most interesting improvement of the steam engine is announced to have been made by a Mr. Rennoldson, of S. Shields, in England, which is likely to come into universal use, if the description be accurate. It so combines three cylinders from one boiler, with connecting rods on a triangular crank, as to move three pistons with such uniformity and equability that the motion is scarcely felt. By this, a fly-wheel is dispensed with, and the machinery occupies less space than that hitherto in operation. These qualities will insure its general adoption by *steam-boats*, if its performance realize the account of this steam engine. In no part of the habitable globe would such an accession to the utility of steam-boats, be hailed with louder acclaim, than *here*, on the banks of the Mississippi, with its thousand rivers, lakes, and bayots.—*Louisiana Advertiser.*

Blowing glass by machinery.—Among the prizes awarded by the French Academy of Sciences, at their last sitting, was the following. 'To Israel Robinet, workman, for the substitution of the action of a machine, for that of the human lungs, in glass blowing, 8000 francs. By means of this valuable invention, the health of the glass-blower will in future be preserved, and the product of the manufacture greatly improved, both as regards accuracy of form and the capability of making articles of greater dimensions than was formerly possible.'

Value of Printing.—In 1274, the price of a small Bible, neatly transcribed, was £30, a sum equal to at least 2 or £300 of our money. A good and clearly printed Bible may now be had for 2 or 3 *shillings*. It is related that the buildings of the two arches of London Bridge cost only £25, which is £5 less than what a copy of the Bible sold for many years afterwards. These facts afford a curious commentary on the changes and advantages produced by the extraordinary invention of printing, which has done so much to

alter or shake all the institutions of the world, wherever the press has appeared.—*English paper.*

Steam Boats.—A Paris paper says that the French are about to follow the example of the U. States, in establishing lines of steam boats along the coast. Two superb boats have been built at Bordeaux, to ply between that port and Havre. A similar enterprise was in progress at Marseilles, and the boats which now run from that port to Naples, are to extend their communication to Havre, touching at the intermediate ports. Steam boats now run from Havre to Hamburg, and thence, during summer, to St. Petersburg.

QUESTION.

MESSRS. EDITORS,—If you think the following question worth a place in the Young Mechanic, it is at your disposal.

It is known to many artists that glass may easily be turned in a lathe to any form required, by applying spirits of turpentine to the common tools used for turning iron, &c. while cutting the glass. If any of your scientific readers can solve the question, why glass is so easily acted upon, by using spirits of turpentine, they will much oblige a subscriber.

W. W. C.

TO READERS AND CORRESPONDENTS.

WE have been repeatedly requested to publish accounts of the more difficult processes of art. Persons in want of information of this kind, are invited to make the same known to us, and the conductors of this work will render them what assistance they can. Those who have useful hints to give, are also invited to communicate the same. EDS.